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said contact face being edge-shaped and extending along a line parallel to the feed roller axis, and being downstream from said support in said feeding direction;

said topmost sheet being fed in the feeding direction by said feed roller and being directed toward said edge-shaped contact face by said tilt face, and said edge-shaped contact face being operative to pass the topmost sheet between said at least one contact face and said feed roller but prevent passage therethrough of a sheet from the stack frictionally engaged with the topmost sheet and moving therewith in the feeding direction.

REMARKS

The application has been carefully reviewed in light of the Office Action dated December 23, 2002.

Claims 1-64 are pending in this application. By the present Amendment, claims 1, 3, 7, 9, 11-15, 18-20, 26, 29, 30 32, 37, 38, 40-44, 47-49, 51, 54, 55, and 57-63 have been amended. It is submitted that no new matter has been added and no new issues have been raised by the present Amendment.

Applicant respectfully submits that the pending claims, as amended, comply with the requirements of the second paragraph of Section 112, and are not anticipated by the applied references.

According to the disclosed embodiments, an edge-shaped contact face of the tilt member extends along the axial length of the sheet feed roller and presses against the roller. For example, in Fig. 3 an edge-shaped contact face 6b of tilt member 6 presses against sheet

feed roller 4.

In contrast, in U.S. Patent 4,535,981 (“Watanabe”), as understood, a flat surface of friction member 72 (Fig. 3) presses against roller 2, not an edge-shaped contact face. Similarly, in U.S. Patent 5,996,989 (“Cahill”), as understood, a separator pad 56 (Fig. 3) also has a flat face pressing against roller 24. U.S. Patent 5,277,417 (“Moritake”), as understood, is similar in this respect – as seen in Fig. 6, a substantially flat surface of a retard plate 46 presses against roller 44. And, in U.S. Patent 6,318,716 (“Okuda”), as understood, again a flat (or concave) face of a separating pad 17 (Figs. 1 and 3) presses against a roller 16.

The patent application explains the advantages of the edge-shaped contact face in its several embodiments, and the independent claims include features that could not be found in the applied references. For example, claim 1 now states that the tilt member has a contact face in contact with the sheet feed roller, and the contact face is “in the shape of an edge extending along an axial direction of said sheet feed roller.” The remaining independent claims also refer to the contact face being in the shape of an edge extending along an axial direction of the sheet feed roller or roller means, or the pressing contact being edge-shaped and extending along a line parallel to a rotational axis of the feed roller. At least this feature and its advantages could not be found in the applied references.

The remaining claims are in dependent form and should be allowable at least for that reason, although it is submitted that at least some of them include additional patentable features.

The Office is hereby authorized to charge any additional fees that may be required in connection with this amendment and to credit any overpayment to our Deposit Account No.


03-3125.

If a petition for an extension of time is required to make this response timely, this paper should be considered to be such a petition, and the Commissioner is authorized to charge the requisite fees to our Deposit Account No. 03-3125.

If a telephone interview could advance the prosecution of this application, the Examiner is respectfully requested to call the undersigned attorney.

Entry of this amendment and allowance of this application are respectfully requested.

Respectfully submitted,



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VERSION WITH MARKINGS TO SHOW CHANGES IN THE CLAIMS

1. (Amended) A sheet feeder for separating sheets [sheet materials] stacked on a pivotable sheet material stacking member and feeding said sheets, one by one, from the topmost sheet [material for feeding each of said sheet materials] , said sheet feeder comprising:

a sheet feed roller configured to come in pressing contact with the topmost sheet [material] for feeding the sheet [material] to a separator; and

a tilt member configured to come in pressing contact with said sheet feed roller and including a tilt face, said sheet feed roller having a front end running against said tilt face, said tilt member having a contact face in contact with said sheet feed roller, said contact face being in the shape of an edge extending along an axial direction of said sheet feed roller.

3. (Amended) A sheet feeder according to claim 1, wherein said tilt member includes translating means for advancing and retracting said tilt member with said edge remaining [in] parallel to an axis of said sheet feed roller.

7. (Amended) A sheet feeder according to claim 7, wherein said elastic metal plate is mounted at [from] the tilt face so as to surround said tilt member on both upper and lower sides.

9. (Amended) A sheet feeder according to claim 1, wherein said sheet feed roller feeds said sheets in a feed convey direction, and the distance in said [a] sheet material convey direction between a location of said sheet feed roller at which said tilt member is in pressing

contact with said sheet feed roller and a location of said sheet feed roller at which a sheet stacked on said sheet [material] stacking member comes in contact with said sheet feed roller is in a range of 2 mm to 6 mm, and the angle of the tilt face of said tilt member to the sheet material convey direction is in a range of 50° to 70°.

11. (Amended) A sheet feeder according to claim 10, wherein said thin elastic member comprises two members spaced from each other along an axis [disposed at both sides] of said sheet feed roller.

12. (Amended) A sheet feeder according to claim 10, wherein said sheet feed roller has an axial length, and said thin elastic member is disposed substantially at a center of said axial length of said sheet feed roller.

13. (Amended) A sheet feeder according to claim 1, further comprising a thin elastic member crossing a tangential direction of a [the] contact area of said tilt member and said sheet feed roller at a location downstream of the contact area of said sheet feed roller with said tilt member, said thin elastic member including a bend [bent] in the shape of hook bent toward said sheet feed roller at a rear end thereof.

14. (Amended) A sheet feeder according to claim 13, wherein said thin elastic member comprises two members spaced along an axis [disposed on both sides] of said sheet feed roller.

15. (Amended) A sheet feeder according to claim 13, wherein said thin elastic member is disposed substantially at the center of and axial length said sheet feed roller.

18. (Amended) A sheet feeder according to claim 17, wherein said friction member comprises two members spaced along an axial length [disposed at both sides] of said sheet feed roller.

19. (Amended) A sheet feeder according to claim 17, wherein said friction member is disposed substantially at a center of an axial length of said sheet feed roller.

20. (Amended) A sheet feeder according to claim 1, further comprising:

a pressure lever having a free end configured to come in contact with and move away from said sheet [material] stacking member;

a sensing lever mounted coaxially with said pressure lever for pivotal movement associated with insertion/removal of a cassette having said sheet stacking member; and

an elastic member disposed between said sensing lever and said pressure lever.

26. (Amended) A sheet feeder according to claim 25, wherein said sheet [material] stacking member includes pressor ribs at both side ends at a front face thereof, such that said first cams come in contact with said pressor ribs.

29. (Amended) A sheet feeder according to claim 27, further comprising a tilt member holder plate between said second cams and said tilt member, said tilt member holder plate being formed with an opening for avoiding a site at which said sheet feed roller comes in contact with said tilt member, said tilt member holder plate having a leading end spaced apart from said sheet [material] stacking member.

30. (Amended) A sheet feeder for separating sheets [sheet materials] stacked on a pivotable sheet [material] stacking member and for feeding said sheets, one by one, from the topmost sheet [material for feeding each of said sheet materials] , said sheet feeder comprising:

sheet feed roller means for coming in pressing contact with the topmost sheet [material] for feeding the sheet [material] to a separator; and

tilt member means for coming in pressing [press] contact with said sheet feed roller means and including a tilt face, said sheet feed roller means having a front end running against said tilt face, said tilt member means having a contact face in contact with said sheet feed roller means, said contact face being in the shape of an edge extending along an axial direction of said sheet feed roller means.

32. (Amended) A sheet feeder according to claim 30, wherein said tilt member means includes translating means for advancing and retracting said tilt member means with said esge thereof remaining [in] parallel to an axis of said sheet feed roller means.

37. (Amended) A sheet feeder according to claim 36, wherein said elastic metal plate is

mounted at [from] the tilt face so as to surround said tilt member means on both upper and lower sides.

38. (Amended) A sheet feeder according to claim 30, wherein said sheet feed roller feeds said sheets in a sheet convey direction, and the distance in said [a] sheet [material] convey direction between a location of said sheet feed roller means at which said tilt member means is in pressing contact with said sheet feed roller means and a location of said sheet feed roller means at which a sheet stacked on said sheet [material] stacking member comes in contact with said sheet feed roller means is in a range of 2 mm to 6 mm, and the angle of the tilt face of said tilt member means to the sheet material convey direction is in a range of 50° to 70°.

40. (Amended) A sheet feeder according to claim 39, wherein said thin elastic member means comprises two members spaced axially along a length [disposed at both sides] of said sheet feed roller means.

41. (Amended) A sheet feeder according to claim 39, wherein said thin elastic member

42. (Amended) A sheet feeder according to claim 30, further comprising thin elastic member means crossing a tangential direction of the contact area at a location downstream of the contact area of said sheet feed roller means with said tilt member means, said thin elastic member means including a bend [bent] in the shape of hook bent toward said sheet feed

roller means at a rear end thereof.

43. (Amended) A sheet feeder according to claim 42, wherein said thin elastic member means comprises two members spaced along an axial length [disposed on both sides] of said sheet feed roller means.

44. (Amended) A sheet feeder according to claim 42, wherein said thin elastic member means is disposed substantially at the center of an axial length of said sheet feed roller means.

47. (Amended) A sheet feeder according to claim 46, wherein said friction member means comprises two members spaced along an axial length [disposed at both sides] of said sheet feed roller means.

48. (Amended) A sheet feeder according to claim 46, wherein said friction member means is disposed substantially at a center of an axial length of said sheet feed roller means.

49. (Amended) A sheet feeder according to claim 30, further comprising:

pressure lever means having a free end configured to come in contact with and move away from said sheet [material] stacking member;

sensing lever means mounted coaxially with said pressure lever means for pivotal movement associated with insertion/removal of a cassette having said sheet stacking member; and

elastic member means disposed between said sensing lever means and said pressure lever means.

51. (Amended) A sheet feeder according to claim 49, wherein said sensing lever means includes a pair of arms at a free end thereof, said arms extending from [both] sides of said tilt member means spaced along an axial length of said sheet feed roller means, wherein said sensing lever means pivotally moves to cause said arms to pass both sides of the contact area of said tilt member means.

54. (Amended) A sheet feeder according to claim 30, further comprising first cam means disposed coaxially with said sheet feed roller means for separating said sheet [material] stacking member from said sheet feed roller means when said first cam means come in contact with [both] side ends of a front face of said sheet [material] stacking member.

55. (Amended). A sheet feeder according to claim 54, wherein said sheet [material] stacking member includes pressor rib means on [both] side ends at a front face thereof, such that said first cam means come in contact with said pressor rib means.

57. (Amended) A sheet feeder according to claim 56, wherein said tilt member means includes rib means at [both] side ends such that said second cam means come in contact with said rib means.

58. (Amended) A sheet feeder according to claim 56, further comprising tilt member holder plate means between said second cam means and said tilt member means, said tilt member holder plate means being formed with an opening for avoiding a site at which said sheet feed roller means comes in contact with said tilt member means, said tilt member holder plate means having a leading end spaced apart from said sheet [material] stacking member.

59. (Amended) An image forming apparatus comprising:

a sheet feeder that separates sheets [sheet materials] stacked on a pivotable sheet material stacking member and for feeding the sheets, one by one, from the [a] topmost sheet [material for feeding each of said sheet materials], said sheet feeder comprising:

a sheet feed roller configured to come in pressing contact with a topmost sheet [material] for feeding the sheet [material] to a separator; and

a tilt member configured to come in pressing contact with said sheet feed roller and including a tilt face, said sheet feed roller having a front end running against said tilt face, said tilt member having a contact face in contact with said sheet feed roller, said contact face being in the shape of an edge extending along an axial direction of said sheet feed roller, and

an image forming mechanism configured to form an image on the sheet material fed out from said sheet feeder.

60. (Amended) An image forming apparatus comprising:

sheet feed means for separating sheets [sheet materials] stacked on a pivotable sheet

[material] stacking member and for feeding the sheets, one by one, from the [a] topmost sheet [material for feeding each of said sheet materials] , said sheet feeder comprising:

sheet feed roller means for coming in pressing contact with a topmost sheet [material] for feeding the sheet [material] to separating means; and

tilt member means for coming in pressing contact with said sheet feed roller means and including a tilt face, said sheet feed roller means having a front end running against said tilt face, said tilt member means having a contact face in contact with said sheet feed roller means, said contact face being in the shape of an edge extending along an axial direction of said sheet feed roller means, and

image forming means for forming an image on the sheet [material] fed out from said sheet feeding means.

61. (Amended) A method of image forming, comprising the steps of:

causing a sheet feed roller to come in pressing contact with a topmost sheet [material] of a plurality of sheets stacked on a pivotable sheet [material] stacking member so as to feed the sheet [material] to a separator; and

making a tilt member come in pressing contact with said sheet feed roller, said tilt member including a tilt face, said sheet feed roller having a front end running against said tilt face, said tilt member having a contact face in contact with said sheet feed roller, said contact face being in the shape of an edge extending along an axial direction of said sheet feed roller.

62. (Amended) A method of image forming, comprising the steps of:

causing a sheet feed roller to come in pressing contact with a topmost sheet [material] or a stack of sheets stacked on a pivotable sheet [material] stacking member so as to feed the sheet [material] to a separator;

making a tilt member come in pressing contact with said sheet feed roller, said tilt member including a tilt face, said sheet feed roller having a front end running against said tilt face, said tilt member having a contact face in contact with said sheet feed roller, said contact face being in the shape of an edge extending along an axial direction of said sheet feed roller; and

forming an image on the sheet [material] fed out from said sheet feeder.

63. (Amended) A sheet feeder comprising:

a support for a stack of sheets including a topmost sheet;

a rotationally mounted feed roller in pressing contact with the topmost sheet in the stack and rotating about an axis for frictionally feeding said topmost sheet in a feeding direction;

a sheet separating member having at least one tilt face at least a part of which is downstream from the support in said feed direction and further having at least one contact face urged in pressing contact with said feed roller;

said contact face [pressing contact] being [(a)] edge-shaped [, (b)] and extending along a line parallel to the feed roller axis, and being [(c)] downstream from said support in said feeding direction;

said topmost sheet being fed in the feeding direction by said feed roller and being directed toward said edge-shaped contact face [pressing contact] by said tilt face, and said edge-shaped

contact face [pressing contact] being operative to pass the topmost sheet between said at least one contact face and said feed roller but prevent passage therethrough of a sheet from the stack frictionally engaged with the topmost sheet and moving therewith in the feeding direction.